

REMARKS

Claims 8-55 are currently pending in the above application.

In the Office Action, Claims 8-21, 23, 25-31, 33 and 35-55 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Garg et al. (U.S. Patent No. 4,902,535) in view of Tate (Japanese Patent No. 61035868) and further in view of Malaczynski et al. (U.S. Patent No. 5,458,927) and further in view of in view of Potter et al. (U.S. Patent No. 5,783,261). Applicants respectfully traverse the Examiner's rejection.

Applicants first herein repeat the arguments provided in their August 1, 2003 response and asserts that the Examiner has not established a *prima facie* case of obviousness as required by MPEP 2143 because the combination of references does not disclose or suggest all of the limitations as contained in independent claims 8, 16, 25 or, alternatively, that there is no motivation to combine the references, contrary to the Examiner's analysis.

Specifically, with regard to independent claim 8, the combination of references does not disclose the application of wear resistant coating applied to the outer surface of an aluminum bell cup.

First, as the Examiner acknowledges, Garg et al. is not directed at an aluminum bell cup. Further, Garg et al. does not apply a wear resistant coating directly to the surface of an aluminum article, but instead applies a coating to a noble layer intermediate, which is used to improve adhesion of the coating.

Also, contrary to the Examiner's analysis in the Response to Arguments Section, as stated in the last paragraph of Page 2, claim 8 does teach that the wear resistant coating is applied to the outer surface of the aluminum bell cup. As no other structure

is indicated in claim 8, this is the only possible way of applying the coating to the surface. As far as the Examiner's position that an adhesion promoter interlayer may be considered part of the wear resistant coating layer, Applicants disagree, because the adhesion promoter layer has no wear resistant properties. Further, the Examiner's statement that the prior art as recited in the background of Garg (Col. 1, lines 13-30) is not directed at aluminum, but is instead directed at titanium and titanium alloys in the prior art:

Second, with respect to Malaczynski, in the latest response, on page 4 of the Office Action, the Examiner states "Malaczynski shows that a hard-carbon coating may be applied to an aluminum workpiece to provide a scuff and wear resistant surface. - See Background of the Invention". This is a gross misstatement. In fact, the Background of the Invention, and also the Abstract, talk about aluminum alloys, not aluminum as the substrate material.

Malaczynski et al. describes a process for forming a diamond-like carbon coating on an aluminum alloy workpiece, preferably automobile components such as pistons, and includes successive immersion steps in different plasma atmospheres to clean the surface of oxygen atoms. Malaczynski then implants a carbide compound while codepositing a carbonaceous layer on the surface, bombards and removes the carbonaceous layer, and to thereafter deposits an amorphous hydrogen containing carbon layer. Malaczynski does not teach a step of preparing the outer surface including a cleaning, etching, and rinsing step prior to an atomic cleaning step. Malaczynski also requires an implantation of a carbide compound step and codepositing of a carbonaceous layer prior to the argon bombardment step that the present invention does not require. Thus, Malaczynski et al. is not directed to the process of applying a wear resistant coating to the outer surface of an aluminum bell cup.

Third, and as stated previously, Tate does not teach the addition of a wear resistant coating, but instead teaches a nitride hardening treatment. In the Examiner's Response to Arguments, page 2, second paragraph, the Examiner states that "a nitride treatment forms a layer of an entirely different material (e.g. a nitride) on the surface of the substrate (e.g. aluminum) in the form of a wear resistant coating". Once again, the Examiner has misstated what a "nitride hardening treatment" is.

As stated in the McGraw-Hill Dictionary of Scientific and Technical Terms (attached as Exhibit A), and is well known to those of ordinary skill in the art, a nitride is defined as "compounds of nitrogen and a metal", while nitriding is defined as "surface hardening of steel by formation of nitrides; nitrogen is introduced into the steel usually by heating gaseous ammonia". In other words, the metal on the surface is reacted with the nitrogen to form nitrides (here, an aluminum alloy), thus hardening the surface. This is different from what the Examiner proposes, which adds a separate and distinct nitride layer onto the aluminum surface. Thus, contrary to the Examiner's analysis, Tate does not teach a wear resistant coating applied to the outer surface of an aluminum bell cup.

Fourth, while Potter teaches degreasing a steel surface before applying a coating in automotive applications, it does not teach the actual application of a wear resistant coating to an aluminum bell cup.

Since none of the references, alone or in combination, teaches the invention as described in independent claim 8, it is allowable over the cited art. Further, dependent claims 9-15, 35-36, and 41-45 are allowable as well. Reconsideration of claims 8-15, 35-36 and 41-45 is respectfully requested.

Similarly, with regard to claim 16, none of the combined references teaches preparing the outer surface of a titanium bell cup, applying a chrome adhesion

promoter coating to the outer surface, and applying a wear resistant coating to the chrome adhesion promoter. Garg et al. discloses a thin layer noble metal intermediate applied to the surface of the titanium bell cup and coated with a hard carbon coating. As one of ordinary skill recognizes, noble metals include Cu, Ag, Au, Pt, Pd, and sometimes Ir (Garg also lists other non reactive metals in Column 6, lines 26-30). It does not include a chrome adhesion promoter. Further, none of the other reference specifically teaches a chrome adhesion promoter. As such, none of the references discloses or suggests the invention as disclosed in modified independent claim 16. Further, dependent claims 17-24, 37-38, and 46-50 are allowable as well. Reconsideration of claims 16-24, 37-38, and dependent claims 46-50 is respectfully requested.

With regard to claim 25, the combination of references does not disclose the application of a wear resistant coating applied directly to the outer surface of spray application equipment.

As stated previously, Garg et al. does not apply a wear resistant coating directly to the surface of spray application equipment, but instead applies a coating to a noble layer intermediate, which is used to improve adhesion of the coating. As stated in previous Responses, Malaczynski similarly does not apply a wear resistant coating directly to the surface, but requires the implanting of a carbide compound prior to the application of the coating, which the present invention does not require. Tate does not teach the addition of a wear resistant coating, but instead teaches a nitride hardening treatment. Finally, Potter teaches degreasing a steel surface before applying a coating in automotive applications, but does not teach applying a coating to a piece of spray application equipment. Since none of the references discloses or suggests the invention as described in independent claim 27, it is allowable over the cited art. Further, dependent claims 28-34 and 39-40, and newly added dependent claims 51-55, are

allowable as well. Reconsideration of claims 27-34 and 39-40 and 51-55 is respectfully requested.

Claims 24 and 32 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Garg et al. (U.S. Patent No. 4,902,535) in view of Tate (Japanese Patent No. 61035868) and further in view of Malaczynski et al. (U.S. Patent No. 5,458,927) and further in view of in view of Potter et al. (U.S. Patent No. 5,783,261) and further in view of Kohler (U.S. Patent No. 5,286,534) and further in view of Mahoney (U.S. Patent No. 6,082,962). Applicants respectfully traverse the Examiner's rejection.

Kohler discloses a process of plasma deposition of a carbon rich coating on a polymeric and flexible substrate (see column 2, lines 28-34) for magnetic recording media. As indicated in column 6, the composition of the feed gas includes a carbon source and silicon containing hydrocarbons, but also includes nitrogen and oxygen containing hydrocarbons that the present invention does not contemplate.

Mahoney teaches the application of a diamond like carbon and silicon doped coating onto a silicon wafer or metal disk from a Hall-Current ion source apparatus to form magnetic transducers and media for magnetic storage equipment. The present invention does not contemplate the use of the particular ion source apparatus disclosed herein. Further, Mahoney is not directed towards bell cups or other spray apparatus.

Applicants thus respectfully suggest that the combination of the references disclosed in paragraph 5 does not teach the present invention. Further, even assuming that the references do teach the present invention, which the Applicants do not concede, the addition of Kohler and or Mahoney represents improper hindsight, in that the Examiner is picking and choosing among disclosures in non-analogous art in an attempt to produce a combination which allegedly teaches the invention as in claims 24

and 32. As such, claims 24 and 32 are allowable over the cited prior art. Reconsideration of claims 24 and 32 is thus respectfully requested.

Claims 22 and 34 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Garg et al. (U.S. Patent No. 4,902,535) in view of Tate (Japanese Patent No. 61035868) and further in view of Malaczynski et al. (U.S. Patent No. 5,458,927) and further in view of in view of Potter et al. (U.S. Patent No. 5,783,261) and further in view of Naik (U.S. Patent No. 4,919,773).

Naik discloses a method for improving the erosion resistance of metallic substrates by first applying a layer of group VI to group VIII or a noble metal (which includes chromium) followed by a layer of a boride, carbide, oxide, or nitride of a metal selected from a Group III to IV element. The Naik reference also teaches the steps of cleaning the surface with detergent, an acidic solution or an alkaline solution.

The present invention, as in modified claim 16, does not utilize a boride, carbide, oxide, or nitride of a metal of a Group III to IV element as a wear resistant coating, nor does it add this wear resistant coating layer to a group VI or VII layer, as in the Naik reference. Instead, it adds a wear resistant coating, preferably carbon based wear resistant coating and more preferably a silicon-doped amorphous carbon coating, coupled to a chrome adhesion promoter material.

Applicants thus respectfully suggest that the combination of the references disclosed on page 6 of the Office Action does not teach the present invention. Further, even assuming that the references do teach the present invention, which the Applicants do not concede, the addition of Naik to Garg represents improper hindsight, in that the Examiner is picking and choosing among disclosures to attempt to produce a combination which allegedly teaches the invention as in claims 22 and 34. Here, the Examiner wants to substitute part of the teaching of Naik, without the additional layer,

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to Garg and then add Tate and Malaczynski to state that claims 22 and 34 are obvious in view of the prior art. This is exactly what the rule against using hindsight references is designed to prevent Examiner's from attempting. As such, claims 24 and 32 are allowable over the cited prior art. Reconsideration of claims 24 and 32 is thus respectfully requested.

In view of the foregoing amendments and remarks, Applicants submit that claims 8-55 are all allowable. Applicants respectfully suggests to the Examiner that they are prepared to file an appeal if necessary to move this case towards allowance, and thus respectfully suggests that the Examiner withdraws his present rejections as being improper and based on incorrect reasoning. Accordingly, allowance of these claims and passage of the application to issuance are respectfully solicited.

The Commissioner is authorized to charge any additional claim fees, which may be required, or credit any overpayment, to Deposit Account No. 06-1510 or 06-1505 in the name of Ford Global Technologies, L.L.C.

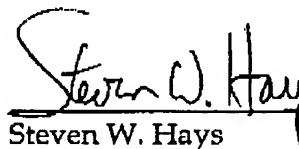
The Examiner is invited to telephone the Applicant's undersigned attorney at (248) 223-9500 if any unresolved matters remain.

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Respectfully submitted,

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